British Columbia

Multispecies outbreak of cryptococcosis on southern Vancouver Island, British Columbia

Cryptococcus neoformans is a ubiquitous saprophytic environmental fungus that causes localized or disseminated mycoses in humans and animals. Disease associated with this organism is usually rare or sporadic. An unusual cluster of human and animal cryptococcosis was identified in British Columbia (BC) in the summer of 2001. The majority of animal cases were initially identified through a single private veterinary laboratory that serves BC and Alberta. Historically, this laboratory diagnoses 4 to 6 animal cases of cryptococcosis per year, but by August 2001, it had diagnosed 12 cases on Vancouver Island alone. The University of BC Centre for Disease Control became aware of a concomitant increase in human cases in the same geographic location. This report focuses on the veterinary aspects of the outbreak.

By the end of March 2002, a total of 45 laboratory-confirmed animal cases and 50 human cases had been identified. Only cases that were substantiated by cytological, histopathological, or culture methods were counted. Additional animal cases were found but could not be confirmed due to lost records or because they had been diagnosed on clinical signs alone. Table 1 summarizes the species involved, plus their predominant clinical or pathological presentation.

The 1st animal case was diagnosed in February 2000. No seasonal pattern of disease has been identified. Given the lack of information on the incubation period of cryptococcosis, the dates of infection remain speculative. The delay between the date of diagnosis and the date of the reported onset of clinically compatible symptoms ranges from 2 d to over 2 mo. All but 7 cases have been found along the east coast of Vancouver Island from Courtenay to Victoria, as well as offshore waters (Figure 1). Three cases occurred in the Fraser Valley on the mainland of BC and 1 occurred in Prince Rupert on the north coast of the province. Four porpoises were found dead and stranded along the east coast of Vancouver Island, a solitary animal was recovered near West Vancouver, and 1 of 9 porpoises from recent strandings in the San Juan Islands, Washington, USA

Table 1. Species and predominant clinical or postmortem presentation of animals involved in an outbreak of cryptococcosis in British Columbia (2000–2001)

	Primary site or nature of lesion						
	Upper respiratory tract	Subcutaneous mass	Pneumonia	Central nervous system	Oral mass	Ocular	Lymphadenopathy
Cat (*n* = 18)	7[a]	8		1	1		1
Dog (*n* = 17)	11[b]	3		1		2[c]	
Dall's porpoise (*n* = 5)			5[d]				
Harbour porpoise (*n* = 1)			1				
Ferret (*n* = 2)		1					1
Llama (*n* = 2)				2[e]			
Total (*n* = 45)	18	12	6	4	1	2	2

[a]2 cats also presented with lymphadenopathy as a primary sign
[b]1 dog also had concurrent ocular lesions while another dog had concurrent central nervous system signs. In each case, respiratory signs occurred first
[c]1 dog had concurrent central nervous system signs
[d]In all 6 porpoises, the most significant lesions were fulminanting pulmonary cryptococcosis with generalized lymphadenopathy
[e]1 llama had pneumonia and central nervous system lesions

Cross-Canada Disease Report provides rapid publication of brief reports of disease trends or new diseases — maximum of 500 words and 2 references. The Report is edited but not refereed.

*Le **Rapport des maladies diagnostiquées au Canada** permet de publier rapidement un bref compte rendu sur l'évolution de certaines maladies ou sur l'apparition de nouvelles pathologies. Comptant au maximum 500 mots et 2 références, le Rapport est corrigé, mais n'est pas expédié en relecture critique.*

Contributions are welcome and may be sent to:

Les articles sont les bienvenus et peuvent être envoyés à l'adresse suivante :

Dr. Craig Stephen
Center for Coastal Health
900–5th Street, Nanaimo, British Columbia V9R 5S5
Tel.: (250) 741-2642; Fax: (250) 468-1585
E-mail: cch@mala.bc.ca

Distribution of Cryptococcosis Among Companion Animals by Community, 1999–2002

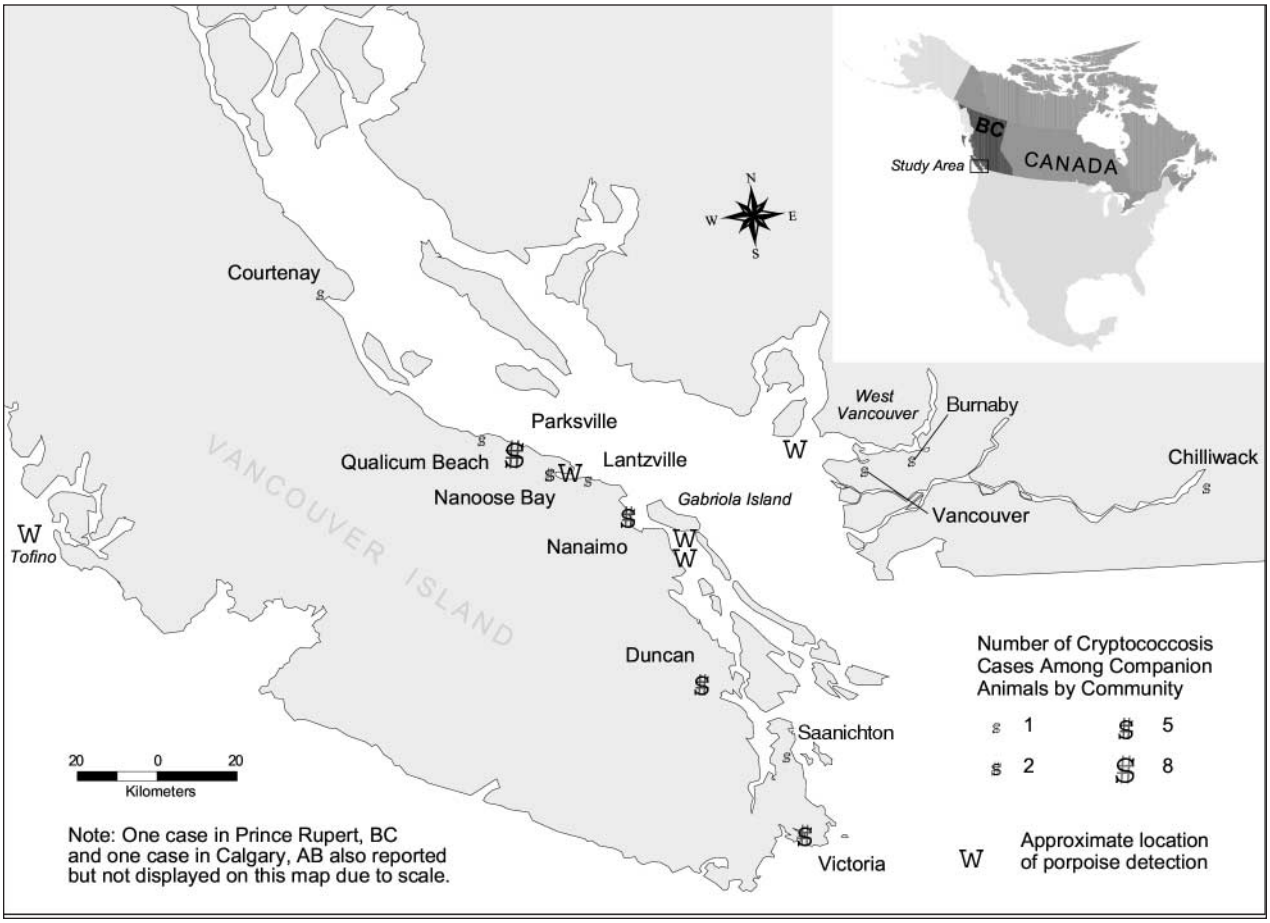

Figure 1. Map of cases of animal cryptococcosis in British Columbia 2000–2001. Locations for domestic species indicate place of residence and for porpoises indicate location of recovery on the beach.

proved positive. Both llama cases originated from the Duncan and Mill Bay areas and presented with neurologic signs.

Fungi isolated from 2 porpoises, 1 cat, and 1 dog were serotyped and each organism was identified as *C. neoformans gatti*, the same as was isolated from the human cases. Serotyping was accomplished by culture on canavanine-glycine-bromthymol blue agar and appropriate biochemical tests, followed by a slide agglutination test (Crypto Check; Iatron Laboratories, Tokyo, Japan). An immunohistochemical test (1) was performed on 9 paraffin-embedded blocks from animals diagnosed with cryptococcosis in the years 2000–2001, including 2 of the porpoises that were serotyped as var *gatti*. The lack of var *gatti* specific antibodies for immunohistochemical testing made diagnoses by negation necessary. All paraffin blocks were more compatible with *C. neoformans neoformans;* however, inconsistent staining patterns made definitive identification difficult. The lack of subspecies specific antibodies for var *gatti* likely accounts for the discrepancy between the immunoperoxidase and serotyping results.

A case series and case-control study failed to demonstrate any significant risk factors for infection apart from a history of living in or visiting the east coast of Vancouver Island from Courtenay to Victoria. Moreover, all but 9 Island cases had some travel history to the central east coast in the Parksville-Nanaimo area. Only 2 animals had a travel history off Vancouver Island. Nine animal owners interviewed to date have failed to identify any connection to the central part of Vancouver Island, but only 3 failed to identify any travel history or residence on the east coast of Vancouver Island. A canine case from Calgary travelled to this epicenter 3 mo prior to developing laboratory-confirmed disease, while a feline case discovered on the mainland had moved from the Island 9 mo earlier. Porpoises are a highly mobile species known to frequent waters offshore with occasional inshore inclusions to forage. The lack of knowledge of the natural history of these animals significantly hinders assessment of their location of exposure.

Immunosuppression has not been identified as a predisposing feature for the vast majority of cases. Prednisone therapy was found in the history of 3 animals. One was being treated for autoimmune hemolytic anemia at the time of diagnosis, 1 had been treated for conjunctivitis with prednisone 1 mo prior to diagnosis, and 1 had received prednisone therapy for dermatitis 6 mo prior to diagnosis. Only 1 animal had a history of cancer, a surgically excised benign basal cell tumor. Polymerase chain reaction tests of pooled lung, lymph

node, and spleen samples from all the porpoises were negative for morbillivirus. Thirty-eight percent (8/21) of animals lived in houses with smokers. Seventy-one percent (15/21) lived in households where the owners regularly gardened. A matched case-control study involving 18 pairs of animals failed to reveal any statistically significant risk factors. Environmental sampling has led to isolation of *C. neoformans gatti* from trees and soil in areas of the central east coast of the Island.

This is the first report of a large-scale outbreak of cryptococcosis that involved humans, terrestrial animals, and marine mammals. To the best of our knowledge, the disease has not been reported to date in free-ranging cetaceans. *Cryptococcus neoformans gatti* is not the variant normally associated with disease in North America. It is usually associated with tropical and semi-tropical regions (2). *Cryptococcosis* sp. detected in animals are rarely taxonomically identified to the species or variant level in diagnostic cases; therefore, it is unclear if the finding of *C. neoformans gatti* is the first for animals in BC. Further investigation will involve reconciling the potentially conflicting taxonomic classification of isolates identified by immunohistochemistry and serotyping.

References

1. Krockenberger MB, Canfield PJ, Kozel TR, et al. An immunohistochemical method that differentiated *Cryptococcus neoformans* varieties and serotypes in formalin-fixed paraffin-embedded tissues. Med Mycol 2001;39:1–11.
2. Sorrell TC. *Cryptococcus neoformans* variety *gattii*. Med Mycol. 2001;39:155–168.

Craig Stephen, *Centre for Coastal Health, 900 5th Street, Nanaimo, British Columbia V9R 5S5, and UBC Centre for Disease Control, 655 12th Avenue West, Vancouver British Columbia V5Z 4R4;* ***S. Lester,*** *Central Laboratory for Veterinarians, 5645 199th Street, Langley, British Columbia V3A 1H9;* ***W. Black, M. Fyfe,*** *UBC Centre for Disease Control, 655 12th Avenue West, Vancouver, British Columbia V5Z 4R4;* ***Stephen Raverty,*** *Animal Health Centre, 1767 Angus Campbell Road, Abbotsford, British Columbia V3G 2M3.*